

Course Title: Microprocessors  
Date: January 2014(First term)Course Code: CCE2108  
Allowed time: 3 hrsYear: 2<sup>nd</sup>  
No. of Pages: (2)

Answer the following problems

Problem number (1) (18 Marks)[a] Put (✓) or (x), then write correct statement (11Marks)

- 1) A bus is set of common connection lines that carry the same type of information.
- 2) In real mode, the code segment is limited to 64 Kbytes in 80386.
- 3) In real mode, segments can begin at any location in the memory system.
- 4) PUSH BX is equivalent to PUSH EBX
- 5) MOV CX, DL
- 6) STD
- 7) MOV CS, BX
- 8) PUSH 73<sub>H</sub>
- 9) LES BX, CAT
- 10) LEA CX, [BL]
- 11) IN DX
- 12) REP STOSW
- 13) AND AL, BL

[b] Draw the internal architecture of the microprocessor 80286, then describe the use of all registers. (7 Marks)Problem number (2) (17 Marks)[a] For the following instructions determine the data addressing mode and define its function. (9 Marks)

- 1) MOV [1234<sub>H</sub>], BX
- 2) DIV CH
- 3) ADD CL, [BX + DI]
- 4) INC BYTE PTR[BX]
- 5) MOV ARRAY[BX], AX
- 6) MOV [BX], DH

[b] Comparison between: (8 Marks)

- 1) The real mode operation and the protected mode operation.
- 2) The 16-bit instruction mode and the 32-bit instruction mode.
- 3) LOOP instruction and JMP instruction.



Problem number (3) (20 Marks)

- [a] In a machine language instruction, what is specified by the MOD field, the D and W bits found in some machine language instructions. (6 Marks)
- [b] If a MOV SI, [BX + DI + 20<sub>H</sub>] instruction appears in a program, what is its machine language equivalent? (6 Marks)

Op-code MOV is 22 <sub>H</sub>			
R/M code	Addressing mode	Code	REG field
000	DS: [BX + SI]	011	BX
001	DS: [BX + DI]	110	SI
111	DS: [BX]	111	DI

- [c] Describe the operation of each of the following instructions and the content of the BX in each instruction after execution assuming the initial values are DS = 0200<sub>H</sub>, BX = 4F82<sub>H</sub> (8 Marks)
- 1) INC BX
  - 2) SUB BH, 20<sub>H</sub>
  - 3) ROR BX, 2 93 E0
  - 4) AND BX, F0FF<sub>H</sub>

Problem number (4) (20 Marks)

- [a] Suppose that DS = 0400<sub>H</sub>, BX = 0300<sub>H</sub>, SS = 0200<sub>H</sub>, SP = 0001<sub>H</sub>, and DX = 0600<sub>H</sub>. Determine the memory address accessed by each of the following instructions and its content, assuming real mode operation: (8 Marks)
- 1) MOV [0700<sub>H</sub>], BX
  - 2) PUSH BX
  - 3) MOV [BX].DX
  - 4) INC BYTE PTR[BX]
- [b] Explain the meaning of the following instructions: (12 Marks)
- 1) .MODEL SMALL
  - 2) PUSH A
  - 3) MOV BX, OFFSET DATS
  - 4) CMOVS BX, DX
  - 5) OUT DX, AX
  - 6) OUTSB
  - 7) DATAS DW 20<sub>H</sub>
  - 8) MUL DI